

REMARKS

In the Office Action, the Examiner objected to claims 27, 41, and 50 for failing to state "and" between the final two operations of those claims. The Examiner also rejected claims 27-57 under 35 U.S.C. § 112, ¶ 2, for using the word "threshold value". In addition, the Examiner rejected claims 27-31, 40, 41, and 44-53 as being anticipated by USP 6,070,108 issued to Andreev et al. (Andreev), and rejected claim 40 as being obvious in light of Andreev. In this Amendment, Applicants have amended claims 27, 41, 42, 50, and 51, and canceled claim 28. Accordingly, claims 27 and 29-57 will be pending after entry of this Amendment.

I. Objection and Rejection of Claims for Informalities and Indefiniteness

In the Office Action, the Examiner objected to claims 27, 41, and 50 for failing to recite an "and" between the final two operations of those claims. Applicants have amended claims 27, 41, and 50 to recite an "and" between the final two operations of the claims.

The Examiner also rejected claims 27-57 under 35 U.S.C. § 112, ¶ 2, for using the word "threshold value". Applicants respectfully submit that the phrase "threshold value" is not indefinite. This phrase is a commonly used phrase in science and engineering to signify the basis for a comparison. Applicants respectfully submit that this phrase is also commonly used in patents to signify the basis for a comparison. For instance, a search for the term "threshold value" in the claims section of patents since 1976 in the US PTO's database returned more than 15,000 patents. Moreover, Applicants respectfully submit that the dependent claims (see claims 32, 35, 38, etc.) provide examples of specific threshold values for some embodiments of the invention. Accordingly, Applicants respectfully submit that the phrase "threshold value" has a commonly understood meaning, and therefore request reconsideration and withdrawal of the § 112, ¶ 2 rejection.

II. Claims 27-31 and 40

The Examiner rejected claims 27-31 and 40 as being anticipated by Andreev, and rejected claim 40 as being obvious in light of Andreev. Applicants respectfully submit that Andreev does not disclose the routing method claims in claims 27-31 and 40. Each of these claims recites a routing method that for a net, identifies a route that uses a first path within the region. The first path shares a common region in the IC region with a set of adjacent paths, where the set has at least one path and each path in the set is adjacent to the first path. This routing method determines whether embedding the route in the region will cause congestion about the first path and the set of paths to exceed a threshold value. In this Amendment, Applicants have also amended claim 27 to clarify that the method embeds the route for the net based at least partially on a determination that embedding the route in the region will not cause congestion about the first path and the set of paths to exceed the threshold value.

Applicants respectfully submit that Andreev does not disclose, teach, or even suggest such a routing method that embeds a route for a net based at least partially on a determination that embedding the route will not cause overcongestion about a path used by the route. Andreev's route determination operation 32 in its Figure 2 is **not based on** the congestion calculation, which is at step 34 of Figure 2 and which is cited by the Examiner as disclosing the determination operation recited in claim 27. **This routing operation 32 occurs prior to the congestion calculation 34.** Accordingly, Andreev's route determination operation 32 does not embed a route based at least partially on a determination that such embedding will not cause overcongestion about a path used by the route.

Applicants believe that Andreev does not disclose such a routing operation since Andreev's routing operation is simply a route determination operation that is performed to assess the quality of the placement identified at step 30 of Figure 2. *See, e.g.,* the final operation 38 of

Figure 2, which identifies finding a suitable placement as the end goal of Figure 2's process. In other words, Andreev discloses a congestion-driven placement method that (1) identifies a placement, (2) identifies routes for the placement, and then (3) determines whether the placement with the identified routes causes an overcongestion. If so, the placement method increases the fictive height of cells, identifies new placements, and determines a new set of routes; if not, the last placement is selected. Hence, Andreev does not disclose, teach, or even suggest embedding a route based at least partially on a determination that the embedding would not cause an overcongestion. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §§ 102 and 103 rejections of claims 27-31 and 40.

III. Claims 50-53

The Examiner rejected claims 50-53 as being anticipated by Andreev. Applicants respectfully submit that Andreev does not disclose the computer readable medium of claims 50-53. Each of these claims recites a computer readable medium that has a computer program for routing a net within a region of an IC layout. The computer program has a first set of instructions that for the net identify a route that uses a first path within the region. The first path shares a common region in the IC region with a set of adjacent paths, where the set has at least one path and each path in the set is adjacent to the first path. The computer program also includes a second set of instructions that determines whether embedding the route in the region will cause congestion about the first path and the set of paths to exceed a threshold value. In this Amendment, Applicants have also amended claim 50 to recite a third set of instructions that embeds the route based at least partially on a determination that embedding the route in the region will not cause congestion about the first path and the set of paths to exceed the threshold value.

Applicants respectfully submit that Andreev does not disclose, teach, or even suggest a computer readable medium with such a computer program, which embeds a route for a net based at least partially on a determination that embedding the route will not cause overcongestion about a path used by the route. As mentioned in Section II, Andreev's route determination operation 32 in its Figure 2 is **not based on** the congestion calculation (at step 34) **as this routing operation occurs prior to the congestion calculation**. As mentioned in Section II above, Applicants believe that Andreev does not disclose such a routing operation since Andreev's routing operation is simply a route determination operation that is performed to assess the quality of the placement identified at step 30 of Figure 2. Hence, Andreev does not disclose, teach, or even suggest embedding a route based partially on a determination of whether the embedding would cause an overcongestion. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the § 102 rejections of claims 50-53.

IV. Claims 41 and 44-49

The Examiner rejected claims 41 and 44-49 as being anticipated by Andreev. Applicants respectfully submit that Andreev does not disclose the routing method of claims 41 and 44-49. Each of these claims recites a routing method that partitions the IC region into several sub-regions, where a plurality of paths exist between the sub-regions, each path represents several routing tracks, and at least a first path shares routing tracks with a set of paths. For a net, the method identifies a route that uses the first path. The method then determines whether embedding the route will cause congestion along the first path and the set of paths to exceed the number of tracks available along the first path and the set of paths. The method embeds the route based at least partially on a determination that embedding the route will not cause the congestion along the first path and the set of paths to exceed the number of tracks available along the first path and the set of paths.

Applicants respectfully submit that Andreev does not disclose, teach, or even suggest this claimed routing method that embeds a route for a net based on a determination that is at least partially dependent on the number of tracks available along the first path and the set of paths. As mentioned above in Sections II and III, Andreev's route determination operation 32 in its Figure 2 is **not based on** the congestion calculation (at step 34) **as this routing operation occurs prior to the congestion calculation**. Accordingly, Andreev's route determination operation 32 *does not embed a route for a net based on a determination that is at least partially dependent on the number of tracks available along the first path and the set of paths*. As mentioned above, Applicants believe that Andreev does not disclose such a routing operation since Andreev's routing operation is simply a route determination operation that is performed to assess the quality of the placement identified at step 30 of Figure 2. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the § 102 rejections of claims 41 and 44-49.

V. Claims 42 and 43

The Examiner found claims 42 and 43 allowable. In this Amendment, Applicants have re-written claim 42 in an independent form. Applicants respectfully submit that claims 42 and 43 are in condition for allowance.

CONCLUSION

In view of the foregoing, it is submitted that the claims are in condition for allowance.

Reconsideration of the rejections and objections is requested. Allowance is earnestly solicited at the earliest possible date.

Respectfully submitted,

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